	American species	Per cent of the total: 210 species	Europeo-Amer. species	Per cent of the total: 42 species	Asiatico-Amer. species	Per cent of the total: 19 species	Europ.-Asiat.-Am. species	Per cent of the total: 120 species	Totals by categories	Per cent of the general total: 391 species
Arctic or alpine species .	**25**	12	**12**	29	**5**	26	**46**	39	**88**	22
Percent of the total: 88 spp.	**28**		**12**		**6**		**52**			
Spp. of temperate regions	**145**	69	**26**	62	**9**	48	**50**	41	**230**	59
Per cent of the total: 230 spp.	**64**		**11**		**4**		**21**			
Spp. reaching subtropical regions	**40**	19	**4**	9	**5**	26	**24**	20	**73**	19
Per cent of the total: 73 spp.	**54**		**6**		**7**		**33**			
Totals by categories	**210**		**42**		**19**		**120**		**391**	
Per cent of the general total	**54**		**11**		**5**		**30**			

and the region bordering the Gulf of St. Lawrence with the possible exception, as far as we know, of two plants: *Alchemilla alpina* and *Houstonia Faxonorum*. The isolation of the Islands has not been sufficient to enable their vegetation to develop not only endemic species but even special varieties and forms.

(*To be continued.*)

THE IDENTITY OF CLADONIA BEAUMONTII.

C. A. Robbins.

(*Plate 157.*)

A difficulty confronts the reader who attempts to reconcile Tuckerman's descriptions[1] of *Cladonia Santensis* and its f. *Beaumontii* with those of Wainio.[2] No allowance for individual difference in the choice of defining terms will account for the lack of agreement between the two sets of descriptions, and a suspicion is bound to arise that the plants actually differ as greatly as the descriptions do;

[1] Tuckerman, Syn. Lich. **1**: 245. 1882.

[2] Wainio, Act. Soc. Faun. Fl. Fenn. **4** (Mon. Clad. 1): 410: 1887 **10** (Mon Clad. 2): 455. 1894.

in other words, that each set of descriptions is accurate but is based upon different plants.

Examination of the material preserved in Tuckerman's herbarium, together with the attached notes, shows that this is indeed the case; that the descriptions of Wainio do not apply to Tuckerman's types; and that instead of two distinct plants being involved there are three, at least. The following will make this clear.

Cladonia Santensis was based on material from the Santee canal, So. Carolina, collected by H. W. Ravenel. The type material in Tuckerman's herbarium bears the following note in Tuckerman's hand. "Decidedly, after renewed exam. C. Santensis Tuck. Suppl. α Nyl. Syn. is a Cladonia near to delicata and not a Pycnothelia. Its reaction is strongly K +. 'Leight. paper on Cladae'."

Cladonia Santensis f. *Beaumontii* was based on material from North Carolina, collected by Curtis and from Alabama, collected by J. F. Beaumont (see Tuck. l. c.). The specimens from Beaumont, which would naturally be considered the type since they are named for the collector and furthermore are the only plants in the group given that name in Tuckerman's herbarium, are annotated by Tuckerman as follows,—"C. fruticulosa erecta straminea epidermide in granulas secedente, dichotomo-ramosa, axillis apicibusq dilatatis dentates perviis, apoth.—." "K —."[1]

The comments together with the descriptions given by Tuckerman in the Synopsis afford a clearer view of the species and of the f. *Beaumontii*. Wainio's description of *Cl. Santensis* from Carolina, collected by Eckfeldt, "thallus et squamae tenuia, anguste laciniata, podetia KHO —, cortice dispersed areolato, apothecia aggregata" is not in agreement with the type plant of Tuckerman, but is, if by no other character, conclusively distinguishable from it by the minus chemical reaction. It is also obvious that Wainio's "*Cl. Beaumontii* (Tuck.) Wain." "secundum specimen orig. in Carolina sept. lectum

[1] A difficulty is met here. While the annotation clearly shows the plant to be other than Wainio's "*Cl. Beaumontii*" the description "axillis apicibusq dilatatis dentatis perviis" is not applicable to Beaumont's plants but it is applicable to the plants collected by Curtis from North Carolina. These, however, are not "dichotomo-ramosa"; as a matter of fact, they represent a rather slender, sterile state of *Cl. squamosa*, referable to the f. *multibrachiata* of Floerke. Tuckerman, in viewing both collections as specifically identical, made the herbarium description broad enough to cover both. In the Synopsis, however, in which occurs the first published description, the wording is quite different. No mention is made of the form as having dilated, open axils and apices and the description better fits Beaumont's plants. The omission is obviously intentional and offers further proof that Tuckerman considered these plants as constituting the type.

(ex herb. Tuck.) autonoma est species, affinis Cl. Gorgoninae, thallo primario diutius persistente, podetiis brevioribus (KHO intense lutescentibus).", differs completely in all essential characters from Tuckerman's f. *Beaumontii* and is as conclusively separable from it by its plus reaction to KOH alone.

A study of Tuckerman's herbarium material will show that he conceded to *C. Santensis* a wide latitude. After establishing the species there are referred to it a number of wholly unrelated plants. Thus, aside from the f. *Beaumontii*, which is certainly entitled to specific rank, and which is represented not only by the plants from Alabama, collected by Beaumont, but also by less slender and less elongated plants simply labeled "*C. Santensis*" (from Aiken, So Carolina, *H. W. R*[*avenel*]; from Texas, *Hall;* from Cuba, *Wright;*) there are referred here "*Cl. Santensis*, C. athelia Nyl. Light. Clad. Hook. Coll. p. 19 viditur, Bluefields Mountain, Jamaica, *Purdee*" (= *Cl. strepsilis* f. *glabrata* Wain. l. c. p. 409.) and "*Wright* Lich. Cuba No. 26, *C. Santensis status imperf.*" (= *Cl. macrophylliza* (Nyl.) Wain. l. c. p. 7.) Besides the *Cl. squamosa* form from North Carolina, *Curtis*, mentioned above, plants from Texas, coll. Wright with "apices pervii!"[4] represent a rather undeveloped state of the same species but shorter, stouter and with the apices more dilated. The lichen from Mission Dolores, California, *Bolander 30*, 1863 (cf. Tuck. l. c. p. 246) is a young state of *Cl. crispata*.

Moreover, plants from Beaufort, South Carolina, *Mellichamp*, and from Aiken, South Carolina, *Ravenel*, 1857, also labeled simply "C. *Santensis*" are essentially similar to material in the Farlow collection from Florida, coll. *Geo. V. Nash 1905*, 1895, determined by Dr. J. W. Eckfeldt as *Cl. Santensis f. Beaumontii*. Here is possibly the key to Wainio's quite natural misconception of Tuckerman's form. The plants from these three stations are KOH plus and agree with specimens from Wareham, Massachusetts, determined for the writer by Wainio, through the courtesy of Dr. Roland Thaxter, as "*Cl. Beaumontii* (Tuck.) Wain." With the exception of the collection from Beaufort, these plants are all in a sterile condition. The material in Sandstede, Clad. Exs. No. 1196, in the writer's set is mostly fertile and differs from Mellichamp's only in having the podetia squamulose.

[4] In the Synopsis analysis of *Cl. Santensis* Tuckerman refers plants from Texas, collected by Wright, to the species.

There are thus found to be represented in Tuckerman's conception of *Cl. Santensis* seven distinct species.[1] Four of these require no comment. The others, around which the confusion centers, are not difficult of separation and the following is an attempt to indicate the determining characters of each. Where practical the descriptions are based upon those of Tuckerman. (cf. Tuck, l. c.)

CL. SANTENSIS Tuck. Am. Journ. Sci. II. **25**: 427. 1858. Primary squamules glaucescent above, white beneath, small becoming somewhat elongate, the margins laciniate to dentate-crenate, KOH +; podetia glaucescent, obsoletely cup-forming, short, stout or slender, simple or short-branched; axils open; cortex dispersed and smoothly globose-areolate, the interspaces pellucid, KOH +; apothecia brownish.

The species is evidently southern. Aside from the station recorded for it by Tuckerman it has been collected in Florida by Rapp.[2] It is a much coarser plant than *delicata*, perhaps not far from *subsquamosa*, but has the pellucid under-surface of the first. The smooth, globose, dispersed areoles are characteristic.

CL. FLORIDANA Wainio in Sandst. Clad. Exs. No. 1196.[3] *Cl. Beaumontii* Wain. Act. Soc. Faun. Fl. Fenn. **10**: (Mon. Clad. 2) 455; 1894, as to description. *Cl. Daytoniana* Merrill, nom. nud. in Sandst. Clad. Exs. No. 1503. Primary squamules grayish-green to whitish-glaucescent above, white beneath, medium size to large, the margins subentire or dentate to sublobate, KOH +; podetia grayish-green to ashy or whitish-glaucescent,—60 mm. tall, esquamulose or squamulose but neither granulose nor sorediate; in sterile states slender, cylindrical, cupless, usually more or less branched particularly above, the branches

[1] Tuckerman's reference of so many widely differing plants to a single species may seem strange. But it is to be remembered that he was a pioneer in the investigation of American Cladonias and that the genus was then less understood than it is at the present time. Many species now well known were wholly unknown to him. The publication of Wainio's Monographia, which came later, not only, as Fink says "brought order out of chaos" but the analyses worked out in it put a truer valuation on specific characters. Characters now looked upon as having specific value Tuckerman viewed as of little importance. On the other hand, characters now taken to be really unimportant were considered by him as greatly important. Hence his conception of *Cl. squamosa* as a species always squamulose "the soon granulate epidermis disappearing at length in crowded ashy-green squamules" led to his inclusion in it of several squamose forms of other species. Hence also his conception of *Cl. Santensis* as a granulose plant, the "granules" affording 'a very characteristical note" explains his reference to it of remote plants, while the fact that the granules "finally disappear" opens the way for the admission of still other plants. It should be noted also that he often used the word "granulose" to indicate any disintegration of the cortex. His treatment of these two species shows this.

[2] *Cl. persquamulosa* Merrill, nom. nudum, in Sandst. Clad. Exs. No. 1207 and No. 1402, belongs here.

[3] The data includes "Podetiis haud distincte scyphifera, KHO denum leviter vel maculatim lutescentia, apicibus axillisve perviis Wain. in litt. 3. 4. 24." In the writer's set the reaction is strongly plus.

short, rigid, ascendant with pointed or subulate apices; axils slightly gaping, usually round-perforate, occasionally closed; in fertile states tending toward stouter and less branched forms with axils more dilated, often becoming obsoletely cup-forming; cortex continuous to areolately dispersed, smooth, subrugose or slightly cracked, the interspaces impellucid, KOH +; apothecia light- to dark-brown, rarely pallid or pale flesh-color, aggregated or subcorymbosely scattered.

Considerable difference exists between the sterile and fertile states. (See plate No. 157, figs. 2, 3, 5, 6) and Wainio's species is, in fact, based on the latter. Both states, however, are nothing more than normal variations in development and both are not uncommonly exhibited in the same plant. (figs. 1 and 4). The species is distinctive and offers no near comparison with any other. It occurs along the coastal plain from Florida north to Maryland and Massachusetts. Characteristic forms may be keyed as follows:—

Apothecia brown or brownish.
  Plants fertile.
    Podetia squamulose.....f. **typica** f. nov. (fig. 5)
    Podetia without squamules.....f. **esquamosa** f. nov. (fig. 6)
  Plants sterile.
    Podetia squamulose.....f. **elegans** Robbins comb. nov. (fig. 7)[1]
    Podetia without squamules.....f. **brachiata** f. nov. (figs. 2, 3)
Apothecia pallid or flesh-color.....f. **pallida** Robbins comb. nov.[2]

Plants from Aiken, S. C., Ravenel (*Cl. Santensis*) in Herb. Tuck. = f. *brachiata* (fig. 3); young state.

Plants from Beaufort, S. C., Mellichamp, (*Cl. Santensis*) in Herb. Tuck. = f. *esquamosa* (fig. 6); pr. p. atyp.

Plants from Florida, Nash, (*Cl. Santensis* f. *Beaumontii*) in Herb. Farlow = f. *brachiata.* Some of the material is undeveloped, similar to Ravenel's plants from Aiken, S. C. The larger part is normally developed and well pictured in fig. 3.

Sandst. Clad. Exs. No. 1503, plants from Florida, Rapp, (*Cl. Daytoniana* Merrill) includes (in the writer's set) thallus and young plants of f. *brachiata,* somewhat similar to fig. 1; and a group of rather undeveloped but typical plants of f. *esquamosa;* (fig. 6) intermixed with a few young plants of *Cl. squamosa.*

Sandst. Clad. Exs. No. 1196, plants from Florida, Rapp, (*Cl. Floridana* Wain.) includes (in the writer's set) a group with thallus and young plants of f. *brachiata* somewhat similar to fig. 1; and a group of well developed examples of f. *esquamosa* together with typical plants of f. *typica;* both of which agree well with figs. 6 and 5.

Cl. Beaumontii (Tuck.) Wainio, Act. Soc. Faun. Fl. Fenn. 4. **4:** 411; 1887. (Mon. Clad. 1.), as to name only. Syn. *Cl. Santensis* f.

[1] *Cl. Beaumontii* f. *elegans* Robbins, Rhodora 27: 51.
[2] *Cl. Beaumontii* f. *pallida* Robbins, Rhodora, l. c.

Beaumontii Tuck. Syn. Lich. **1**: 245. 1882.[1] Primary squamules small to medium size, glaucescent above, white beneath, the margins laciniate to denticulate, KOH —; podetia glaucescent, esquamulose or scatteringly squamulose, cylindrical, becoming slenderly elongate, branched, the branches dichotomously divided; apices imperforate or occasionally minutely perforate, obtuse, cristate-denticulate; axils closed; cortex dispersed, soon minutely scattered, KOH —; apothecia brown.

The species is not truly granulose. (Cf. Tuck. l. c.; also see note 5). It is somewhat remote from the two preceeding and under Wainio's arrangement of the genus would properly come under the section *Clausae* Wain.; possibly not far from *pityrea*. So far as known its distribution is wholly southern.

The writer is indebted to Dr. S. F. Blake for helpful criticisms and suggestions in the preparation of this paper and to Dr. C. W. Dodge for similar aid and also for assistance in the herbarium.

Onset, Massachusetts.

Explanation of Plate 157.

Cladonia Floridana Wain. Variations in development. Plants from Wareham, Massachusetts. Herb. *C. A. Robbins*, No. 540, a, b, c, d, e, f, g. Fig. 1. Thallus with fertile and sterile plants; Fig. 2. Sterile plants from among grass in open pine woods (f. *brachiata*), a robust state; Fig. 3, Similar to No. 2 but more slender, the common form; Fig. 4, Plants with both fertile and sterile proliferations; Fig. 5, Fertile, squamulose plants (f. *typica*), robust specimens; Fig. 6, Fertile, esquamulose plants (f. *esquamosa*); Fig. 7, Sterile, squamulose plants (f. *elegans*).

SPARTINA PATENS AND OTHER SALINE PLANTS IN THE GENESEE VALLEY OF WESTERN NEW YORK.

W. C. Muenscher.

Spartina patens (Ait.) Muhl. was found on low swampy ground bordering Wolf Creek below the salt factory at Silver Springs, Wyoming County, New York. This grass, which, with *Juncus Gerardii* Loisel., forms a large part of the "wild hay" of the salt marshes of the Atlantic Coast, apparently has not previously been reported this far inland. The only New York State records that could be found for *Spartina patens* are those from Long Island and the vicinity of New York City.

[1] *Cl. stenophylliza* Wain., nom. nudum, (*Cl. stenophyllia* Merrill) in Sandst. Clad. Exs. No. 1184; from Sanford, Florida, leg. Rapp, is, as it is represented by the writer's set, a young state of this species.